

Chapter 8

Extension Services for Rural Development

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Abstract At the beginning of the twenty-first century, rural populations are faced with a number of opportunities that generations of farmers have only dreamed of. Rural extension services play a pivotal role in providing smallholders and other client groups with the information, knowledge, and qualifications required to exploit these emerging opportunities. Starting with a review of the evolution of concepts and paradigms in extension science and practice over the past decades, this chapter elaborates on the major cornerstones of successful rural extension work; viz. extension contents that help farmers understand the functioning of markets and improve market information and transparency; initiating and institutionalizing communication and horizontal exchange among farmers through group-oriented extension approaches; answering the manifold of information requirements and consulting needs of the diverse client groups; and designing organizational arrangements for extension that are equally effective and cost-effective. The chapter concludes by providing an outlook on the opportunities and limitations that extension services face in relation to rural development.

Keywords Advisory services • Agricultural innovation • Farmer groups • Market-oriented extension

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8.1 Introduction

At the beginning of the twenty-first century, rural populations are faced with a number of opportunities that generations of farmers have only dreamed of: In most parts of the tropics and subtropics, smallholders are realising increasing exposure to market opportunities born from the increasing demand for high-value agricultural and forestry products in the growing urban centres. Specialized production technologies and advanced technical equipment have been developed that match the requirements of very specific ecological, economic and social conditions and that make farming and forest operations more safe, environmentally sound and profitable activities. Globalizing information flows, growing levels of international cooperation and exchange, and the increasing mobility of populations have contributed to strengthened civil societies that encourage political participation of previously marginalized population groups and foster entrepreneurial freedom. Yet, most of these opportunities come at the price of increased ambiguity and complexity. To name but few, smallholders that attempt to exploit the growing market opportunities are confronted with an unprecedented volatility of agricultural and forestry commodity prices, strict production standards, and tightened quality requirements prescribed by global wholesalers and processing companies; climate change and the more frequent incidence of extreme weather events lead to an increased risk of crop failures and require farmers to adapt their farming practices to these conditions; resource scarcity and degradation increasingly impact the potential for intensifying or expanding primary production; and the coalescing world results in changing lifestyles and preferences that tend to accelerate out-migration from rural areas and deeply affect the way of rural life. Navigating these challenges puts high demands on smallholders in terms of the contextual knowledge, specialized skills, and methodological competencies they require.

Rural extension services can play a pivotal role in providing smallholders and other client groups with the information, knowledge, and qualifications required to exploit the emerging opportunities while simultaneously balancing risks. Instructing farmers on more sustainable production technologies – or helping farmers to generate and disseminate these technologies; educating smallholders on the functioning of markets and strategies to mitigate the risks of increased market production; supporting women farmers to organize in marketing cooperatives or other groups that link them with input providers and wholesalers are some of the eminent contributions rural extension services can make. But the role of extension by far transcends the immediate effect of such services: In a broader sense, extension can help foster entrepreneurship thereby initiating and guiding the transformation of largely subsistence-based communities to more diversified rural economies (Kennedy and Thomas 1996; Saether 2010). It can enhance the capacity of farmers for critical inquiry and for taking action in the pursuit of a more democratic and liveable world (Kroma 2006); and is thus an important accelerator of rural and community development (Hoffmann et al. 2009b).

So far, most of the work in extension science and practice has focussed on the improvement of agricultural practices and the promotion of cropping and livestock technologies. Extension advice specifically tailored to forest management or farm forestry development has received comparatively little interest. Kress (2001) explicates a number of distinctive features that differentiate forestry extension from other extension work, among them:

- The long time horizon that the extension advice needs to take into account, as the lifetime and growing cycle of forests usually extends over generations;
- Legal restrictions imposed on the utilization and management of forest resources by local communities;
- The predominantly collective ownership of forest resources that requires extension services to develop and employ methods suitable to address groups of farmers and entire communities rather than individuals;
- The central role of women in utilizing and maintaining forest resources in rural areas;
- The difficulties in motivating resource-poor farmers to participate in long-term forest management activities;
- The low economic value of most forest products and marginal profitability of forest management, explaining why forest management activities are of only secondary importance for most smallholders;
- The necessity for extension agencies to also consider the non-productive forest functions;
- The large number of societal demands and influences on the forest resources;
- The requirement for forest extension agents to undergo trainings that enable them to appropriately address the multi-disciplinarity of topics.

Despite these very specific frame conditions of forestry extension, the strict separation of forestry from agricultural extension work is not very helpful. Many pertinent questions in the extension sphere are more general in character and thus refer to agricultural and forestry extension alike. Such questions comprise, *inter alia*, the quest for extension approaches and systems that are equally effective and cost-effective, culturally adapted, and exploit the benefits of modern communication technologies. More fundamental questions concerning strategic objectives refer to operating models and delivery modes, breadth of contents and client groups, and the sustainability of extension interventions *per se*.

Moreover, there are a number of arguments in support of integrated extension services that take a more holistic and cross-sectoral perspective: the composite nature of most smallholder farm systems that integrate various undertakings and activities; the complex relationships, interactions and repercussions among the single elements of the ecosystem; the inter-sectoral nature of the rural development challenge; and the highly diverse range of service needs of the various client groups and strata of the farming population, for example. The points raised by Kress, then, no longer represent features unique to forestry extension but constitute the basic conditions that are pertinent for rural extension services in general. Yet, much of the traditional work on agricultural extension fails to appropriately address these aspects.

This chapter aims to trace the evolution of concepts and paradigms in extension science and practice over the past decades to provide the foundation of the contemporary understanding of predominating extension contents, approaches and organizational arrangements appropriate to address the challenges of rural development. The chapter concludes with an outlook on the opportunities and limitations that extension services face in relation to rural development.

8.2 Some Definitions

Except in the sections that describe the more conventional understanding of these concepts, the following comprehension shall be used throughout this book:

Extension denotes the process whereby the extension agent seeks to enhance the client's capability to solve his acute problems. This largely involves providing content expertise and process facilitation during the cycle of joint problem definition, identification of alternative options, selecting, and implementing the most appropriate solution. This also involves providing information and facilitating linkage with markets and stakeholders of the value chains in order to enhance rural entrepreneurship. This requires a trusted and reciprocal relationship between the advisor and the client, with the advisor being solely committed to the welfare of his client. The client preserves the freedom to make decisions and to assume personal responsibility for any actions, because he or she alone must ultimately bear the consequences of these actions (adapted from Hoffmann et al. 2009b).

Innovations are products, equipments, services, practices, methods, ideas, and socio-organizational or political arrangements that often emerge in response to a distinct problem and that usually imply new forms of co-ordination among stakeholders (Leeuwis and van Ban 2004). Innovations are dynamic and undergo a constant process of change and gradual improvement by various stakeholders (cf. Kroma 2006; Reij and Waters-Bayer 2001). Innovations are not necessarily entirely new, but novel in a particular place and context (OECD 2005).

Social networks denote a set of social relationships of different strength that link a set of actors, and effectively convey role model effects, persuasive forces, opportunities for confirmation, and other forms of social influence required to promote the diffusion of innovations. Communication networks are the patterns of contact that are created by the flow of messages among communicators through time and space (Monge and Contractor 2003).

Farmer organizations denote formal organizations representing small-scale farmers who produce a range of commodities (ISNAR 1994). They mainly comprise national or regional level federations, associations and producer organizations that aim to handle the supply of farm inputs and/or marketing of particular commodities.

Farmer groups represent one distinct category of farmer organizations at the local and community level (Heemskerk and Wennink 2006; ISNAR 1994). Following the definition of groups, farmer groups are social aggregates of a minimum of 5–7 (Ellis and Fisher 1994) individuals who possess a common identity, with the same goals and objectives, share a common fate, exhibit structured patterns of interaction and modes of communication, hold shared perceptions about group structure, are personally and instrumentally interdependent, reciprocate interpersonal attraction, and consider themselves to be a group (Carron and Hausenblas 1998, cited in Carron and Brawley 2000).

8.3 Evolution of Concepts and Lines of Thought

8.3.1 *From Linear to Complex: Concepts of Innovation Generation and Diffusion*

The conception of a linear research-development chain prevailed during most of the previous century. This view postulates a clear division of tasks between the various stakeholders engaged in technology generation and application: Researchers generate technologies through fundamental and applied research, extension agencies persuade farmers to adopt the technology packages by creating awareness, interest and know-how, and smallholders and commercial enterprises ultimately apply the technologies generated (Leeuwis and van Ban 2004; Röling 1995). Inherent in this conception was the thinking that innovations are largely technical improvements of current practices, spreading among target audiences largely mechanistically as described in the diffusion of innovation theory (Rogers 1962). This theory postulates that the innovation diffusion process, represented by the cumulative number of adopters over time, typically takes a sigmoid growth curve. Based on the assumption that innovativeness, as other human traits, is normally distributed among humans, populations are classified into distinct adopter categories¹ that typical characteristics are ascribed to. In addition to these characteristics, the properties of the innovations, type of the innovation-decision, nature of the social system, and type of extension interventions have been postulated to influence the diffusion process.

Yet, accumulating evidence suggested that the predictions made by the linear model were largely not supported by empirical observations. For instance, there exist many examples where farmers change, adjust and improve technologies and practices without the involvement of scientists thereby independently generating locally adapted innovations (see, for example, Reij and Waters-Bayer 2001; Hoffmann et al. 2007). It is now largely undisputed among innovation scholars that rather than in a linear fashion, innovations emerge through an iterative process of technical and institutional change that necessarily involves a mix of stakeholders,

¹ I.e., innovators, early adopters, early majority, late majority, and laggards (Rogers 2003).

requiring new forms of coordination (e.g. Leeuwis and van Ban 2004; Rametsteiner and Weiss 2004; Kroma 2006; McIntyre 2009; Röling 2009). Innovations are no longer perceived as being merely technical in nature but as containing novel social, organizational, and political arrangements as well. Mumford (2002), for example, describes ten social innovations that emerged between 1726 and 1757 in Philadelphia. More recent examples of innovative socio-political and organizational practices and arrangements from rural development comprise, inter alia, the enactment of participatory planning procedures, the establishment of micro-finance institutions and grain banks, or the inception of village resource user groups. Finally, the diffusion of innovation theory proved to be an over-simplistic model of reality (Geroski 2000; Frenzel Baudisch and Grupp 2006). Vanclay and Lawrence (1994) pointed out the fact that the diffusion of innovation is not a suitable framework for environmental innovations due to the external effects usually associated with this type of innovation. Hoffmann (2007) criticises the largely empiricist nature of the framework that lacks a sound theoretical foundation. Table 8.1 provides an overview on the evolution of models of innovation during the past 60 years.

In contemporary rural extension science, system models of innovation, of which Röling and Engel's agricultural knowledge information system (AKIS) is probably the currently most pre-eminent example, have superseded linear models of innovation (Röling and Engel 1991). The concept denotes the set of stakeholders involved in the generation, transformation, dissemination, and utilization of relevant knowledge and information, and their links and interactions (Röling 1990, cited in Röling and Engel 1991). Innovation systems grant conditions conducive for innovation generation and dissemination by fostering cooperation and managing conflict among stakeholders; providing a platform for learning and experimentation; reducing uncertainty; developing an infrastructure for strategy and vision development; and creating incentives (Kubeczko and Rametsteiner 2002; Rametsteiner 2010).

In line with the advancement of innovation theories, the diffusion of innovation theory has also been replaced by more sophisticated conceptions of innovation spread. Building on accumulating evidence that human behaviour, attitudes, values, and norms are socially constructed, modified and transferred through interpersonal relationships (e.g., Erickson 1991; Friedkin 2001; Stahr 2001), social network theory and related concepts have been increasingly used to investigate and explain the diffusion of innovations. Communication network analysis (e.g., Monge and Contractor 2003; Valente 2006) represents the sub-section of social network analysis commonly applied to the diffusion of innovations. Recent work in the field of agricultural and agroforestry innovations comprise, inter alia, Conley and Udry (2001, 2005), Darr (2008), Raini et al. (2005), and Spielman et al. (2010). The diffusion of forestry-related innovations has, to our knowledge, not been studied using the social network framework.

Table 8.1 Evolution of models of innovation

Innovation model	Impetus	Agenda	Theoretical foci and predominant concepts
1950s Black box models	Explain innovation as an outcome of resource use – but without explaining the process of innovation itself	Input and output of R&D sector	‘Big science’: scientific autonomy and independence through public funding
1960–1970s Linear models	Explain innovation as a step-by-step process that culminates in adoption by final users	Success factors and failure causes for innovations; diffusion of innovations; market failure as justification for public investments in R&D	Technology-push and need-pull models; barriers to innovation
1980s Interactive models	Replace sequential conception of innovation process by a more complex understanding stressing interacting stages and feedback loops	Factors and players involved in innovation; communication and collaboration during the innovation process	Innovation cycles, technological gaps
Early 1990s System models	Explain the success of small firms in innovation as a result of their interactions and cooperation with other stakeholders	Innovation networks; interactions, interconnectedness and synergies in innovation networks	National systems of innovation (e.g., Freeman 1995); Agricultural knowledge information system (Röling and Engel 1991)
Late 1990s Evolutionary models	Explain success and failure of technologies as a consequence of selection processes and the influence of the surrounding environment	Variety of innovations; fitness, adaptation, and selection of innovations; competition and collaboration; influence of the external environment	Innovation avenues, technological trajectories
1990–2000s Innovative milieu models	Explain success of highly innovative small and medium enterprises that do not possess resources to maintain aggressive R&D strategies	Influence of territorial and local factors on innovation process, e.g. support networks, working environment, and social, cultural and natural characteristics (e.g. climate, quality of life, etc.)	Innovation clusters/geographic proximity (Porter 1990); collective learning

Source: Adapted from Marinova and Phillimore (2003)

8.3.2 *From Production Focussed to Facilitating Linkage: Extension Paradigms, Strategies, and Systems*

Driven by the linear conception of the innovation process, the transfer of technology² paradigm has been the dominant view in extension science and practice for decades. The concept is rooted in (1) a realist and positivist stance in science, i.e. the belief in scientific progress; (2) the premise of a continuing productivity increase, which leads to scale enlargement, intensification, and specialization; and (3) diffusion of innovations as a key mechanism for scaling up (Röling 2002). Hence in this thinking, the primary purpose of rural extension services has been to aid general economic development and industrialization policies, such as the increase of primary sector production through the promotion of modern farm and forest management technologies, or the increase of governmental revenues from export commodities such as coffee, rubber, timber, or palm oil (Rivera 1991). Heavy investments in agricultural and forestry research and technology development; the creation of large governmental extension services; and the promotion of large-scale and inflexible extension systems such as ‘T&V’³ by international donors were direct manifestations of this paradigm.

Growing concerns with the cost of financing public extension and its apparent failure to meet broader environmental and development goals sparked increasing criticisms of the paradigm, starting from the 1980s (McIntyre 2009; Rivera 1991). The marginalization and ignorance of farmers’ local indigenous knowledge (Vanclay and Lawrence 1994) were increasingly regarded as the cause of the limited effectiveness of public extension efforts. The structural adjustment programs implemented by World Bank and IMF additionally increased the pressure to abandon ineffective public agricultural and forestry extension services and the paradigm they had been based on in a number of developing countries (e.g., Farrington 1994). Table 8.2 provides an overview on the evolution of the extension paradigms and predominant concepts.

Based on the conviction that farmers are active problem-solvers who continuously change, improve, and adjust technologies to local conditions; that successful technological innovations usually need to be accompanied by appropriate social and institutional arrangements; and that innovations emerge not from research alone but through the interaction of a multitude of stakeholders, extension paradigms have increasingly acknowledged the contribution of farmers and other

² Also called ‘linear model’ (e.g. Kline and Rosenberg 1986), ‘pipeline model’ (e.g. Biggs 2007), ‘persuasive transfer’ (Leeuwis and van Ban 2004), or ‘technology supply push pathway’ (Röling 2009).

³ ‘Training and Visit’, hierarchically organized extension system mainly promoted by the World Bank and adopted by many governmental agricultural extension services throughout the developing world. The system was based on a rigid schedule of extension staff trainings and fortnightly farmer visits, mainly of innovative contact farmers, strong linkages with research stations, and supported by agricultural input and credit supply (Benor et al. 1984).

Table 8.2 Evolution of extension paradigms

Extension paradigm	Impetus	Agenda	Theoretical foci and predominant concepts
Pre-1960s Transfer of technology	Extending research findings from laboratories to farmers' fields	Increasing agricultural and forestry production through introducing modern technologies	Message transmission – transmission model (Shannon and Weaver 1949)
1960s Improving technology transfer	Increasing farmers' awareness in order to improve poor uptake of technology	Educating farmers to establish market-orientated farm enterprises	Adoption behaviour – diffusion of innovations theory (Rogers 1962), adult learning
1970s Farming systems research	Improving fit of technologies to farmers' heterogeneous environments	Creating innovations oriented to farming systems	Holistic thinking, systems thinking
1980s Participatory technology development	Tackling inappropriate technologies and inequity among target group by involving farmers in the innovation process	Exploring and building on indigenous knowledge, ensuring participation of powerless population strata (e.g., women, poor)	Power, community development, gender, organizational learning, group work, team building
1990s Facilitating learning	Improving understanding of ecological and social processes and general principles	Fostering ecological sustainability and social justice by changing institutions and relationships	Communicative rationality, systems thinking, cognitive processes
2000s Facilitating linkage	Facilitating emergence of locally adapted (social and technological) innovations by managing interactions at interpersonal and institutional level	Improving linkage, coordination, and (horizontal) knowledge exchange among extension stakeholders	Agricultural knowledge information systems (Röling and Engel 1991), social networks, farmer groups

Source: Adapted after King (2000), cited in Holding Anyonge (2002)

stakeholders in the innovation process since the 1980s (Leeuwis and van Ban 2004; Röling 1995). Building on the systems model of innovation, the focus of the current paradigm is on facilitating the linkage and knowledge exchange at the interpersonal level in farmer groups and organizations, as well as at the level of stakeholders and institutions of the entire innovation system.

After disbanding the hegemony of the traditional public extension services, an increasingly complex and pluralistic extension landscape has emerged. This consists of a multitude of private sector and not-for-profit extension service providers and in some countries also includes revitalized public extension agencies (Rivera and Alex 2004). This development followed a diversification of extension objectives, exceeding the narrow focus on production and productivity increase promoted under the traditional paradigm. Examples include promoting learning and

knowledge exchange among farmers, enhancing the general problem-solving ability of smallholders, fostering general human resource development, and building institutions and institutional capabilities (Rivera 1991; Swanson 2008). Leeuwis and van Ban (2004) distinguish six major goals that extension interventions can pursue, and identify appropriate strategies that suit the particular purpose (see Table 8.3). Numerous extension systems have been developed and implemented in the field. With their emphasis on facilitating farmer problem solving, improving the link between stakeholders, or enhancing farmer empowerment, these systems fundamentally differ from the extension work under the traditional paradigm of persuasive technology transfer.

Providing cutting-edge knowledge and expertise to farmers who actively seek specialist advice for a specific problem; guiding their problem-solving process; and permanently enhancing their problem-solving ability by imparting suitable methodologies and frameworks are the major goals of advisory extension interventions. Typical examples comprise, *inter alia*, recommending to a woman farmer a number of tree species that she could grow on her farm-yard; instructing a forest user group how to apply basic forest inventory methods to determine the allowable cut and monitor the amount of timber extracted by the group members; or advising the manager of a forest holding on how to increase revenues from timber sale by optimizing grading of timber. The strategy is thus equally appropriate in situations where clients are individual farmers who are highly specialized and technologically advanced (Röling 1995), or where groups of farmers are concerned with the management of communal resources.

The core objective of the facilitation strategy is to encourage farmers' experimentation and to support them to exchange their knowledge, experiences, and observations with their colleagues thereby promoting the spread of locally adapted innovations (Gerster-Bentaya and Hoffmann 2001). This typically refers to group extension settings. The Farmers' Forest Management Schools established in Nepal as a response to the farmers' interest in learning more about community forest management practices in groups is one example of this strategy (Singh 2003). Through facilitating participatory and discovery learning approaches, group dynamic exercises, and regular interactions, the extension worker aims to build the farmers' capacities and enhance their self-confidence. This ultimately makes them less dependent on outside expert knowledge and external inputs when managing their resources. Thus, the strategy is particularly appropriate in circumstances where the solution is highly site-specific, requiring profound local knowledge that external experts usually do not possess (Röling 1995; Leeuwis and van Ban 2004). An example of this would be the conversion from conventional logging to community forest management or even watershed management.

In situations where appropriate solutions to the problem at hand do not readily exist, building coherent innovations becomes the main purpose of the extension intervention. For example, the short supply of high quality seedlings of native high value tree species at affordable prices is a common problem for many forestry projects. Developing simple propagation methods that can easily be applied in village nurseries, where methods of modern germplasm research are usually

Table 8.3 Different intervention goals, appropriate strategies, and typical extension systems

Intervention goal	Extension strategy	Role of extension worker	Role of client(s)	Key processes involved	Typical extension systems
Aid policy objectives mainly related to productivity increase	Persuasive transfer of innovations	Strategically manipulate the clients' behaviour	'Unexpected' receiver (initially)	Adoption, acceptance	T&V
Assist client to solve problem/enhance problem solving ability; focus on whole farm	Advisory communication	Consultant/counsellor (expertise and/or process guidance)	Active problem owner	Problem solving, counselling	Socio-economic advisory work in German smallholder forestry
Enhance knowledge exchange; enhance diffusion of innovations	Facilitation/support horizontal knowledge exchange	Expert, facilitator	Active learners/source of experience	Learning, networking, problem solving	Farmer field/forest management schools, Farmer-to-farmer extension
Create coherent innovations	Facilitate process of innovation generation	Facilitator, resource person, supporting vertical knowledge flow	Active participants	Problem solving, social learning, network building, negotiation	Participatory technology development, Farmer research groups, Farmer-led experimentation, Farmer innovation approach
Form organizations that take over initiative; strengthen position of a group	Support organization development and capacity building	Organizer, trainer, facilitator	Active participants	Social learning, negotiation	Participatory action research
Manage pre-existing conflict	Conflict management	Mediator, facilitator	Stakeholder participant	Negotiation, social learning	

Source: Adapted from Leeuwis and van Ban (2004); Hoffmann et al. (2009a)

unavailable, represent a significant challenge. Extension workers could organize the process of generating these methods. In addition to solving the technical aspects of how best to produce the seedlings, the innovation also requires new organizational, socio-cultural and/or political arrangements, such as funding of research work by donors, village-level collective action to establish and operate the nursery, or cooperation with private-sector stakeholders for input supply and marketing. Generating this innovation would therefore require the interplay of multiple actors – such as, farmers, researchers, development practitioners, operators of private nurseries and local authorities. Ensuring the farmers' participation in experimentation and testing the germination practices; facilitating the interaction of the stakeholders, e.g. by forging links between the community and private-sector tree nurseries for knowledge exchange; agreeing implementation plans and time-lines; overseeing the adequate provision of resources; and creating platforms that foster stakeholder coordination and mutual understanding are some of the critical tasks to perform by the extension worker in such context. Group as well as individual extension approaches can apply in the scope of this strategy.

Based on the conviction that most innovations require adequately functioning farmer and community organizations, such as forest user groups, farmer innovation circles, marketing cooperatives, etc., establishing the organizations that are required to make the intervention successful or sustainable, or strengthening the position of a particular group towards other stakeholders, e.g. traders or exporters, can also be the objective of an extension intervention. Organization development and group capacity building is the appropriate extension strategy in such contexts. By working with farmer groups, this strategy aims at strengthening a particular group's capacity to innovate, to help themselves, and/or to make claims towards local authorities or more powerful stakeholder groups. Extension workers in such situations typically initiate the establishment of groups and organizations, contribute to group activities and processes, provide training in organizational skills, and facilitate processes of organizational change (Leeuwis and van Ban 2004).

Managing pre-existing conflict is the appropriate intervention strategy in circumstances where unresolved disputes, e.g. over access to natural resources, have potentially negative effects on the well-being of the community and/or the state of the natural resources. This contemporary extension strategy has the least in common with the traditional understanding of extension services. Typical conflicts arise between sedentary farmers and pastoralists over the use of communal grasslands or water resources; over the extraction of firewood and timber from the village forest by members of a neighbouring community or forest user group; or between the forest authority and forest dwellers around the legitimacy of their traditional forest use rights. In such situations, the neutral extension worker facilitates in creating a negotiation platform, institution building and organizational development, and mediation that aims to support the stakeholders in finding innovative and more productive solutions to the conflict. Usually this involves working with groups of stakeholders rather than with individual farmers. However, in order to be successful mediators, extension workers require specific skills and insights that are not yet widely available (Leeuwis and van Ban 2004).

Regardless which of these strategies is identified as most appropriate in a particular context, there is widely shared consensus among extension researchers and practitioners that extension interventions need to address the farmers' demands – or even stimulate the demand for the innovation⁴; respond to changing knowledge needs; and assume a systemic perspective that considers the economic, social and environmental consequences of the innovation along the entire value chain.

8.4 Cornerstones of Successful Rural Extension Work

8.4.1 *Extension Contents: The Need for Market-Oriented Advice*

Farmers and tree growers usually face a number of challenges that concern technical, environmental, managerial, and other aspects of their management activities. While they successfully overcome many of these problems themselves, some might be rather complex, requiring specific expertise to solve. Determining growth rates and the maximum allowable cut of natural forests and timber plantations; preparing detailed management plans that meet the legal requirements; selecting the tree species most appropriate to the prevailing environmental conditions and management objectives; identifying the necessary management practices and most economic working methods for thinning, pruning, timber harvest, and other operations; or optimizing the grading of timber and other forest products after harvest are some examples. While such needs create a strong demand on the side of farmers for clearly defined advisory services and extension contents, past rural extension work has not always been successful in responding to these specific needs.

Extension advice traditionally focused on introducing more productive and sustainable farm and forest management practices, where technological aspects of these innovations have been the focus of extension work for decades. Relatively little attention was paid to the economic context the farmers were operating in, neither with regard to the micro-economics of the farm households nor regarding the market demand and quality requirements for farm products. Yet, economics have a significant impact on farmers' management objectives and choice of practices. This is evident in the influence on farmers' livelihood strategies, through

⁴ Pointing at the trade-off between demand-led and persuasive extension, Garforth (2004) holds the view that extension advice needs to be demand-driven, as long as farmers pay the full price for the services; and that if governments or other public stakeholders provide extension services as quasi public goods, it is legitimate for the extension service to support specific policy objectives. Yet, the challenge remains that farmers are unlikely to adopt innovations on a sustainable basis that do not match their needs. Stimulating the demand for the innovation, e.g. by creating successful demonstration examples, helping farmers to access markets, or by creating legal frame conditions that enable – or if necessary also stipulate – innovation adoption, is likely to be the more successful approach.

determining the optimal combination of assets, resources, and off-farm activities in a certain farming system; the optimal balance of risks and security measures; and the appropriate level of intensification and market integration. Most field advisors are not familiar with, or trained to help farmers in, solving these kinds of problems (Hoffmann et al. 2009b).

Aspects such as the size of the market for the introduced products, the availability of storage and processing facilities, or negotiation and marketing skills required by farmers to profitably sell their produce have rarely been addressed by rural advisors. Extension services that operated under the transfer of technology paradigm, and likewise progressive intervention projects with a strong local or sector focus, were particularly prone to insufficient market orientation. Case in point is where farmers could not sell their produce due to lacking markets, products spoil because of a lack of transport infrastructure, or markets collapse after too many farmers had jumped on the bandwagon (cf. Swanson 2008). Non-adoption has often been the rational response by smallholders to the introduction of such innovations that largely disregarded the economic realities.

Decades of trade liberalization have significantly increased the exposure of most smallholders to market forces. The globalizing agribusiness and forestry industries and trade in these sectors' commodities have created demand for farm and forestry products in regions largely cut off from the global economy until recently. Lifting farmers out of subsistence economies through encouraging market production has become a common rural development strategy (World Bank 2007). Smallholders are thus increasingly exposed to market risks, face volatile input and commodity prices, and are confronted with the bargaining power of global market players. In order to enable farmers to take proper advantage of the arising opportunities, the need for extension services emerges that help them to better understand the functioning of markets, assess the economic risks and opportunities of certain products, link farmers to insurance and other risk-reducing mechanisms, and improve market information and transparency.

Market-oriented advisory services (Neuchatel Group 2008; Swanson 2008) aim at unlocking rural entrepreneurship and creating income opportunities for smallholders through market development and improving their market access. Given the poorly developed value chains for most agriculture and forestry products in the tropics, these services primarily focus on facilitating and brokering between different value chain actors, establishing transparency, and enhancing the reliability and efficiency of the interactions. This requires extension agencies to expand their traditional scope from working primarily with farmers to addressing the stakeholders along the entire value chain that can contribute to overcoming deficiencies and bottlenecks. Such actors include producers, input and commodity traders, wholesalers, processors, export companies, providers of infrastructure, or financial institutions. Market-oriented advisory services also require the provision of more integrated extension advice that encompasses enhancing farmers' technical, economic and marketing know-how including, inter alia, post-harvest handling, contract negotiation, and brand development; imparting managerial skills and initiating the development of self-help organizations such as producer groups or marketing

cooperatives; providing market information; and facilitating linkage and negotiation among the stakeholders of the entire value chain. This is not to say that a single unified extension service will have to cover all the client groups and topics mentioned. What is necessary is an increasing awareness of the need for market-oriented advice among all stakeholders of the extension sector.

With the objective of establishing functioning markets and improving the efficiency of agricultural and forestry value chains, thereby fostering rural development, market-oriented extension services can be regarded as a core domain of governmental action. A variety of organizational models, ranging from public, public-private, entirely private sector, or community extension services can contribute to this aim. In their most comprehensive form, these services can trigger the transformation of the entire regional or even national agricultural or forestry sector.

8.4.2 *Extension Approach: Group Versus Individual Extension*

Traditional and modern methods of mass communication such as television and radio programs, print products, mass events like trade fairs and field days, as well as internet and mobile phone services continue to be useful in extension work as far as simple messages are communicated. Yet, in a globalizing and ever growing complex world, extension messages become increasingly differentiated and complicated. Extension agents can best support farmers to successfully cope with uncertainty and volatility, to interpret abstract and partly contradictory information, and to derive concrete actions that apply to their own situation through personal face-to-face interaction with farmers in individual or group extension settings.

8.4.2.1 Why Group Extension Is the Approach of Choice

As a consequence of the commodity orientation of agricultural extension services during the colonial era, and of the productivity growth and technology focus after independence, vast agricultural and forestry estates as well as progressive and large-scale farmers have been the primary targets and recipients of rural extension services for decades. Extension systems such as T&V have been built on the contact farmer concept, according to which, extension agents primarily work with few individual farmers who were expected to share their experiences and knowledge with other farmers (Benor et al. 1984). However, the secondary transfer of information from the contact farmers to the communities has been much less successful than predicted, and adoption rates have commonly been very low among non-contact farmers (Röling and Pretty 1997). Addressing groups of peasants rather than individual farmers, therefore, has been one modification to the T&V, which aimed at increasing the number of farmers receiving face-to-face service from

extension, thus alleviating the limited technology diffusion from contact farmers (e.g. Wuyts-Fivawo 1996; Anderson et al. 2006). Yet, the unified and rather simple messages were inappropriate to the highly diverse world of rainfed farming and did not fit the specific demands of the small-scale farmers (Hoffmann et al. 2009a).

With the onset of system models of innovation and the shift to facilitative extension systems, rural extension services increasingly focused on small-scale farmers and their traditional institutions. Initiating, intensifying and institutionalizing communication and horizontal knowledge exchange among farmers have become core tasks of extension work (e.g. Scarborough et al. 1997; Selener et al. 1997). The following advantages are commonly attributed to group-oriented extension approaches (e.g., Belay and Abebaw 2004; Feder et al. 2010; Hagmann et al. 1999; Hoffmann et al. 2009b):

- Reduced transaction cost of providing extension by exploiting the scale effects and farmer linkage mechanisms that these groups offer;
- Increased extension effectiveness based on a higher level of farmer participation and the reinforcing effects of group learning and group action;
- Improved accountability of extension providers by making them directly accountable to the members of the group;
- More sustainable extension interventions as a consequence of organizational development and capacity building that help institutionalize communication and collaboration patterns among farmers;
- Opportunity to address the free rider problem of public-good extension by enabling some cost recovery at local level.

Historical cases of technology diffusion, as well as contemporary empirical evidence, suggest that many rural innovations disseminate through the farmers' ordinary social relationships and networks. These relationships and networks usually are not a target of extension interventions. Through their interactions, farmers are exposed to information, attitudes, and the behaviour of their peers, thus increasing the likelihood that they will develop beliefs, assumptions, and attitudes similar to those of their fellow farmers (Monge and Contractor 2003).⁵ Darr (2008) for example, found that relatively simple agroforestry innovations, such as live fencing, spread without the intervention of extension agents. This is merely a product of day-to-day farmer interactions. The comparative advantage of group-oriented extension particularly lies in activities requiring collective action, such as natural resource management and pest management (Feder et al. 2010). Many accounts of group-oriented rural extension interventions have been successful (e.g. Heemskerk and Wennink 2004; Noordin et al. 2001; Simpson and Owens 2002; Wambugu et al. 2001). Yet, these also face a number of challenges, which include weak dissemination of technologies within and beyond the targeted population (e.g., Davis 2006; Tripp et al. 2005) or only a marginal increase of agricultural

⁵ This mechanism of innovation diffusion is commonly referred to as 'contagion by cohesion' (e.g., Valente 1999) or 'relational proximity' (Rice 1993).

Fig. 8.1 Most appropriate extension approach as determined by the client group and innovation complexity (Source: Authors' elaboration)

Relative complexity of the innovation	Complex	Group extension Diffusion most successful through farmer groups that are facilitated by extension agents	Individual extension Diffusion most successful through individual extension methods
		No intervention Sufficient diffusion through group and non-group social networks without intervention of the extension service	No intervention Diffusion mainly results from information provided through publications, mass media, internet and other sources
	Simple	Homogeneous (e.g., smallholders)	Heterogeneous (e.g., specialized commercial enterprises)
		Homogeneity of the client group	

productivity (e.g., Feder et al. 2004); the failure to benefit low-resource and powerless farmers (Carney 1996); and high demands in terms of the interpersonal and social skills and competencies required by the extension agents, in order to manage group processes and mediate conflicts, for example (see Box 8.1).

Group-oriented rural extension is deemed less suitable in situations where there is a complex technological problem to solve, or a technologically progressive and highly specialized client group require advanced and specific expert advice (Feder et al. 2010); where competition among the enterprises limits the scope for cooperation in groups⁶; or where a dispersed location or other socio-cultural and economic limitations constrain collective interactions. Thus, with increasing farm development and specialization of smallholders in the tropics their need for situation-specific and individually-tailored extension advice will certainly increase. Individual extension may be the more appropriate choice under such circumstances (see Fig. 8.1).

Thus, group extension is clearly not a panacea and ‘one size fits all’ solution. Identifying the most appropriate intervention, which is in accordance with the prevailing socio-cultural, environmental, and economic conditions, remains a difficult task in rural extension work. Rural extension work in most parts of the developing world is still mainly about promoting the adoption of comparatively basic technologies by culturally and socio-economically homogenous subsistence

⁶ Yet, Rosenfeld (2001) reports that, promoting inter-firm networks through working with groups of enterprises has been a successful approach to foster rural development in a number of European countries and the US. Among the most important benefits of cooperation for members were reduced costs, access to information and ideas, and solutions to common problems.

farmers, rather than about giving specialist advice to highly advanced farming entrepreneurs. Given the obvious advantages and empirically proven success of the group approach under these circumstances, extension services should aim to work with existing farmer groups, actively promote group establishment in settings where they are lacking, and facilitate farmer-to-farmer knowledge exchange across social and spatial divides. Ensuring that the majority of rural households have access to basic extension services through their farmer groups, additional specialist advice could be provided, on request, to individual households belonging to minor or marginalized subsections of the population, such as particularly vulnerable households or highly advanced farming entrepreneurs.

Box 8.1 Failing to Reap the Benefits from Group-Oriented Extension: The Case of the ‘Integrated Natural Resource Management in Ukambani’ Project in Kenya (2005)

The Forest Department of Kenya and the Belgian Technical Cooperation jointly implemented the ‘Integrated Natural Resource Management in Ukambani’ Project (INRMU) in four districts of the Eastern Province between 1997 and 2005. Through sustainable management and use of natural resources, the project aimed to increase food security and income of the farmers living in the project area (INRMU 2005; van den Abeele and Macharia 2001). To this end, INRMU addressed the development and application of advanced technologies for intensive dry-land farming through efficient water use and soil conservation techniques. Extension packages consisted of technical advice, provided through regular farm visits by the extension officers, a number of highly advanced technical inputs such as soil conditioners and water cisterns made of corrugated iron sheets, and an attractive cost-sharing arrangement. Through these packages the project aimed to encourage farmers to adopt the project innovations and to commercialize their activities (INRMU 2005). Farmer-owned businesses, such as a sawmill, a honey processing centre and a horticulture marketing cooperative, had been set up in order to allow farmers to sustain their commercial activities after project conclusion.

36 extension officers of the Forest Department and a number of untrained frontline extensionists constituted the field-level personnel of the project. The area of responsibility of each extension officer extended over approximately three administrative divisions. Each extension officer had been equipped with a project motorcycle.

Due to the long tradition and cultural importance of farmer groups in the area (Tiffen et al. 1994), self-help groups, mainly of women, originally had been identified as the most suitable vehicle for extension (INRMU 2005). 46 groups had been provided with training, material and credit for project implementation during the pilot phase (Ngatiah 2000). However, the project

(continued)

Box 8.1 (continued)

has failed to fully reap the benefits of group extension. Extension agents of the project have not been able to appropriately manage the groups and mediate the conflicts that frequently arose over group members' individual land dedicated to group purposes. In the eyes of the project staff, the groups failed to effectively coordinate joint work, to responsibly administer the communal funds, and to properly maintain the group-owned infrastructure (van den Abeele, personal communication). Driven by concerns of project success, the project managers ultimately decided to dismiss the group extension approach and rather focus their efforts on a small number of individual farmers who were more easily to work with. These farmers eventually implemented the project activities on their individual land holdings.

The apparent failure of this case is the inadequacy of the project to equip its extension officers with the methodological competencies and interpersonal skills required to successfully manage farmer groups and facilitate intra-group processes. For group extension, a new type of sensitive extension agent with good communication skills and social empathy is required, which was – and, unfortunately, partly is – not readily available (Leeuwis and van Ban 2004). At a more abstract level, the case also illustrates the incongruity of group-oriented extension with interventions pursuing a traditional transfer of technology. This is inherently the case in the technocratic design of INRMU's extension packages.

8.4.2.2 How Innovations Disseminate Through Farmer Groups

Hoffmann et al. (2009b) recommend starting the promotion of local innovation by forming a group of farmers who will study it, and decide who of them will put it to test. Theoretically this has a number of advantages and reads as a plausible suggestion. Yet, studies that investigate the performance of farmer groups, and success in terms of diffusion of rural innovations in particular, are rare (exceptions include Alvarado 1980; Davis et al. 2004; Place et al. 2002; Were et al. 2006). Hence, existing theoretical conceptions of innovation dissemination in farmer groups are generally not well elaborated and are partly inconsistent.

Based on a profound review of four theories that explain the diffusion of innovations from the perspective of different scientific backgrounds and research traditions, Darr (2008) derived the multiple-pathway model of innovation diffusion (Fig. 8.2). The model is founded on the premise that the spread of innovations is influenced by direct contact between individuals.⁷ In line with the propositions

⁷ Apart from pure information on the innovation, other aspects such as trust, advice, social influence, and role model effects simultaneously transfer through social relationships. In addition to creating knowledge and awareness of an innovation among potential adopters, social exchange

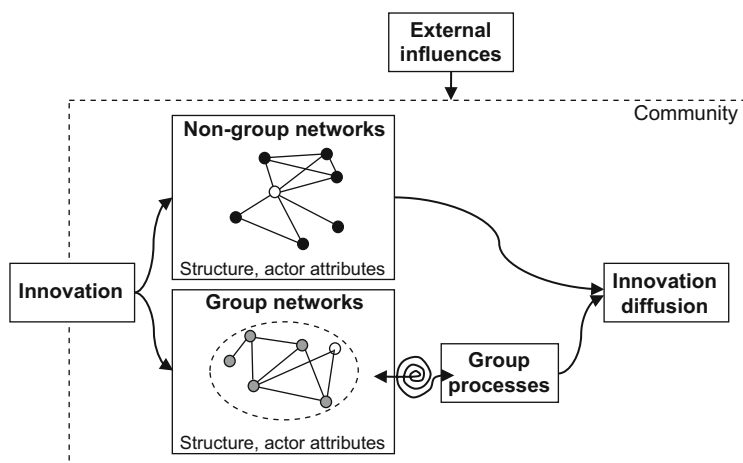


Fig. 8.2 The multiple-pathway model of innovation diffusion (Source: Darr (2008), modified)

made by social network theory (e.g., Coleman et al. 1957; Kilduff and Tsai 2005; Monge and Contractor 2003; Scott 1998; Valente 1999; Wasserman and Faust 1998), the information flow and, hence, diffusion of innovations within the community is presumed to take place simultaneously through multiple pathways, i.e. via different types of relationships in various network types such as formal farmer groups, informal communication networks, family bonds, or relationships of mutual assistance and exchange of tools, farm inputs and other supplies among households. Network structure as well as individual attributes of the network actors are conceptualized as key variables in determining innovation diffusion at the network level. In accordance with functional group theory (e.g., Ellis and Fisher 1994; Hollingshead et al. 2005; Wittenbaum et al. 2004), the diffusion of innovations among the members of a farmer group is thought to be influenced by group processes and variables such as homogeneity, activity, and group climate in a non-linear manner. Innovation-related and context-specific variables are additional factors influencing the diffusion of innovations according to the model.

From an empirical point of view, the proposition of innovation diffusion by relational proximity is in line with the social reality of most rural regions of the tropics and subtropics. Given the remote location, poor road access and limited availability of modern communication media (see Chap. 3), face-to-face conversations represent the primary form of information exchange amongst farmers. The innovation-related information flows are two-step, moving from modern media to advisors and other disseminators, who then introduce the contents into farmers'

plays an important part in persuasion and social imitation that induce individual decision-making, implementation, and confirmation of the adoption decision.

communication networks. Rural life in socio-economically homogeneous communities provides plenty of opportunities for daily interaction and the formation of relationships between neighbours, kin, members of age cohorts etc. An important aspect of these relationships, support networks, and indigenous organizations is that they allow farmers to better cope with the hardship of rural life.

8.4.2.3 Why Groups Are More Effective

Innovations that require collective actions, such as the sustainable management of community forests or the implementation of soil protection structures on communal slopes, can most effectively be promoted by extension agents working with groups of farmers and using group methods (Feder et al. 2010). But also for innovations that require farmers to take independent adoption decisions, farmer groups are important and effective vehicles to promote the diffusion of these innovations.

The strength of interpersonal social relationships is likely the attribute most critical for the diffusion of innovations in social networks. Infrequent interactions with socially and spatially distant others are typically referred to as ‘weak’ ties, while frequent and regular interactions with people who are similar and socially close, i.e. share the same attitudes and behaviours, are usually labelled as homophilous, cohesive, or ‘strong’ ties. Both weak and strong ties have shown to be necessary for successful innovation diffusion. Weak ties are stronger at carrying information about new ideas (Granovetter 1973; Rogers 2003). The argument here is that social circles of weakly tied actors tend to overlap less (Strang and Soule 1998), providing non-redundant information at a comparatively low cost (Hansen 1999). On the contrary, strongly related partners share many ties to third parties and so have little news to report to each other. By creating more and shorter links between distant individuals in a network, weak ties accelerate the rate of diffusion (Valente 1999). A lack of weak ties can therefore act as a diffusion barrier (Rogers 2003). The positive effect of strong ties on innovation diffusion, on the other hand, has been attributed to more rewarding interpersonal communication (Rogers and Kincaid 1981), higher levels of trust and reciprocity (cf. Monge and Contractor 2003), compounded by social pressures and persuasive forces exerted by cohesive networks (Strang and Soule 1998).

More than most other forms of social interaction in rural places, farmer groups combine the features and benefits of both strong and weak ties. This fact forms the first argument in explaining the effectiveness of the group approach. Farmer groups, particularly if facilitated by extension agents, usually foster the formation of weak ties and the exchange of information across social and spatial community strata, i.e. among farmers who would not be connected to each other without the groups. Simultaneously, farmer groups provide the opportunity, if not necessity for group members to regularly interact and cooperate in order to perform the group activities and to attain a common group objective. These interactions create relationships of mutual dependency and trust that effectively convey role model effects, persuasive

forces, opportunities for confirmation, and other forms of social influence that facilitate the promotion and diffusion of innovations.

Further illuminating the effects of strong vs. weak ties on innovation diffusion, knowledge sharing has been conceptualized as a dual process of knowledge 'search' and knowledge 'transfer' (Hansen 1999), or of 'innovation' and 'imitation' (Liu et al. 2005): On the one hand, actors look for and identify relevant knowledge and information through their social relationships in order to innovate or adopt innovations earlier than others. Due to their capacity to link distant actors and to provide better information access, weak ties are more useful during this process. On the other hand, mimicking the adoption behaviour of others and incorporating new knowledge into the activities of the recipient typically requires extra effort. Due to their higher interaction intensity, the strength of behavioural pressures, the actor's emotional commitment to the relationship, and the restricted access to potentially contradicting information, strong ties are more useful here, particularly when complex knowledge is concerned.⁸

Darr and Pretzsch (2008) show that the relative contribution of the 'search' and 'innovation' versus 'transfer' and 'imitation' mechanisms to the diffusion process varies with the prevailing extension approach. In situations of group extension, where a relatively large number of farmers have direct access to information, innovations disseminate more successfully through strong ties because they convey behavioural pressures and role model effects that shape individual innovation adoption decisions more effectively. Due to the abundant information available in this context, weak ties cannot capitalize on their search advantage. In contrast, in the context of individual extension and information scarcity when looking for the knowledge sources is relatively more important, actors who possess extended weak ties are in a better position to access limited and dispersed information; and actors who additionally possess strong links to these sources are in the best position to ultimately adopt the innovation.

The second argument explaining the effectiveness of the group approach in rural extension refers to the coincidence of information abundance and strong social relationships. Successful group extension interventions, through directly addressing a large number of farmers, significantly increase the abundance of information in the community. Simultaneously, through supporting group formation and facilitating group processes, group extension enhances the formation of dense and cohesive relationships in farmer groups (e.g., Darr 2008). Thus, successful group extension interventions promote the emergence of – or even overtly create – those social relationships that most effectively disseminate the innovations given the level of information available.

⁸ In a similar vein, Levin and Cross (2004) introduce the notion of 'trusted weak ties', which combine the advantages of both strong and weak ties; Swan et al. (2003) show the relevance of local vs. global networking during the various stages of the innovation process; and Uzzi (1996) concluded that optimal networks consist of both types of ties.

The third argument refers to the mediating influence of external facilitation and increased group activity on the relationship of group homogeneity and innovation diffusion. Groups composed of members who are dissimilar in terms of major socio-economic or cultural characteristics and therefore linked by sparse and weak ties, usually face barriers to innovation diffusion that are caused, for example, by less satisfactory modes of communication among members, less effective interaction patterns and lower degrees of mutual trust (cf. Rogers and Kincaid 1981; Monge and Contractor 2003). Darr (2008) shows that external facilitation and increased group activity are key mechanisms to overcome diffusion barriers inherent to unfavourable group compositions. Innovations, in fact, disseminate more effectively in heterogeneous farmer groups if these groups are characterized by high levels of group activity. Directly and indirectly enhancing group activity and facilitating the emergence of such cohesive relationships among the members through, for example, intensifying member interaction, aiding in conflict resolution, and fostering a climate of trust and mutual obligation, constitute the central contribution of group-oriented extension services to enhance the diffusion of innovations among farmers. Likewise, external facilitation and increased group activity can also improve the performance of overly homogeneous groups. Rural extension, thus, has the potential to simultaneously facilitate and balance the two opposing mechanisms of structural cohesiveness and relational weakness of group networks by encouraging member interaction and group activity. This fosters a climate of trust, mutual dependency and cohesive relationships. Furthermore, extension services facilitate and encourage linkages with other groups and external sources of information, exposing the members to new ideas, as well as increasing group diversity through purposively bringing farmers together, from across many social and spatial divides.

Darr (2008) makes a fourth argument for the group extension approach: There is evidence that group-oriented extension, in particular if it is strong and persuasive, can at least in parts compensate for any obstruction of the innovation diffusion process that may result from insufficient group processes, such as poor communication among group members or low levels of member commitment. In addition, the involvement of extension agents in group decision-making that, for example, helps to expedite lengthy discussions and tough processes of consensus building, that presses for necessary decisions, and that responsibly steers the development of the group, seems to be one important success factor of the group extension approach. Figure 8.3 summarizes the arguments made.

The superiority of group-oriented rural extension interventions in popularizing the adoption of comparatively basic technologies among culturally and socio-economically largely homogenous populations of subsistence farmers is thus grounded on three facts: group-oriented extension services (a) facilitate the emergence of cohesive relationships among the group members, which in turn foster effective innovation spread; they (b) have the potential to stimulate the activity of the farmer groups, which can compensate for less effective diffusion under unfavourable group composition; and they (c) partially compensate for diffusion disadvantages that result from an unfavourable group climate. This proposition further augments the case made by Liu et al. (2005) and Newman and Dale (2007),

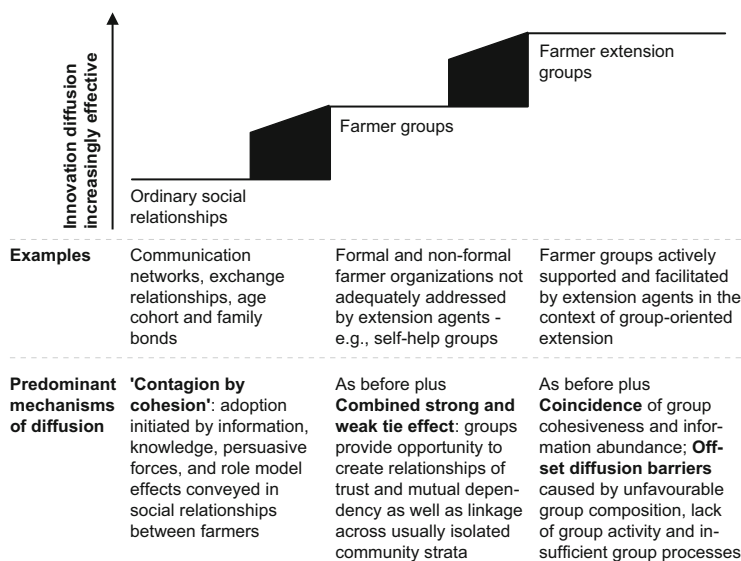


Fig. 8.3 Effectiveness and predominant mechanisms of diffusion of rural innovations in various types of farmer networks (Source: Authors' elaboration)

who suggest that diffusion processes and group performance can be promoted by actively manipulating network structure and group composition.

8.4.3 Diversity of Client Groups: Serving Distinct Needs

Individuals vary with regard to their capabilities, resources, and preferences; and they make decisions based on their personal experiences and evaluation of the future, the expectations of their social environment, and other subjectively perceived opportunities and constraints. Farmers who face comparable natural and socio-economic conditions nevertheless are dissimilar by way of their livelihood strategies, the farming practices they employ, the risks they take, or with regards to the aims and levels of the timber production they pursue, for example.

Small-scale and mostly subsistence-oriented farmers constitute, by far, the largest client group for providers of rural extension services in the tropics and subtropics. Although the degree of their integration in local markets may vary, these farmers typically grow staple crops, rear small domestic animals, or collect forest products mostly for their own sustenance. Consequently, the farmers usually lack the cash and capital resources required to adopt more productive or more profitable farm activities such as farm forestry and high-value agricultural production. Adherence to traditional farming practices maintains this feedback mechanism by limiting their ability to generate marketable surpluses and thus cash income. Extension services can help these farmers to break the vicious circle by increasing their ability to participate in local markets, invest in their farm businesses, and take the risks of

increased market involvement. Providing advice on agroforestry practices, establishing micro-credit schemes, and linking the farmers to input and output markets are some critical contributions extension services can make.

Women-headed households are usually more resource constrained. They often face significant challenges concerning farm labour that result from the lack of the male workforce once the husband has moved or passed away. Commonly, these women are not able to summon the physical labour needed to cultivate their entire farm. This usually results in lower yields, marketable surplus production and hence cash income. Consequently, these households often need to lease out parts of their farmland in order to purchase their needs. Given their lack of land and financial resources these women farmers often prefer to grow a small number of trees, primarily for firewood. Extension advice would therefore need to focus on intercropping and other agroforestry practices. Affluent households, in contrast, may be able to acquire the land, labour, and capital resources needed to establish and operate a decent farm forestry undertaking. Producing firewood and timber for household consumption and sale may be their typical objectives; and the extension services would focus on the establishment and management of woodlots and small-scale plantations.

Forest dwellers and farmers living in the vicinity of forests typically derive a significant part of their livelihood from harvesting timber and collecting non-timber forest products such as resins, gums, vines, nuts, or mushrooms. During hunger periods forests are an important safety net that provide alternative sources of supply for foodstuff and farm income. Yet, the unregulated over-exploitation of some of these products, the adverse effects of forest degradation and deforestation, and natural fluctuations of availability and supply of the NTFPs threaten the livelihood of these communities. Extension interventions could mitigate these impacts through a focus on improving local value-added processing and marketing of these products, facilitating the establishment of local institutions that enforce sustainable management practices, or developing technologies that allow for domestication of these products on farmsteads.

Absentee landlords may primarily be interested in land use options that require a minimum of supervision and labour. The cultivation of perennial tree crops under a contract farming arrangement (see Sect. 8.4.4) is therefore a very attractive alternative for this client group. With the objective of optimal returns on their land, owners of large estates may predominantly be interested in establishing a commercial plantation for high quality export timber production, or softwood production for pulp and paper industries. In this instance, extension services would focus on mechanized plantation management or the mediation of conflict between the plantation and adjacent communities, *inter alia*.

Finally, commercial farmers and operators of large-scale plantations of trees or perennial agricultural crops such as coffee, tea, or oil palm typically require general business consultancy and customized technical advice on specific aspects of their production process. The first may include, for example, strategy and marketing topics, assistance in accounting, financial assessment of investment options, or provision of legal advice. Customized technical advice usually concerns aspects such as the training of operating staff on new harvesting equipment, soil sample

analysis to determine the appropriate rate of fertilizer application, and recommendations on pest management among others. Thus, as diverse the realities and forest production objectives of these archetypes of farmers, so too are their information requirements, demand for technical services and business advice, assistance in linking to markets and value chain stakeholders, and thus the consulting and extension needs of these client groups.⁹

Besides the various types of small-scale and commercial tree growers, there exist a number of other potential client groups for rural extension services – especially where the role of extension is understood to transcend traditional advisory communications. Noteworthy of these include forest contractors, farm input and commodity traders, operators of warehouses and storage yards, timber transport companies or processing plants and other value chain stakeholders that may be significantly involved in, and benefit from, the provision of advisory services aimed at increasing market and value chain efficiency. Unauthorized users of contested natural resources, such as pastoralists who graze their herds on a sedentary farmer's land; pharmaceutical companies and biotech start-ups that encroach on natural forests for bioprospecting; or migrant settlers who do not obey local customary rules are potential client groups if extension agents engage in the mediation and resolution of pre-existing conflicts. Public authorities, NGOs, research institutions, donor agencies, churches, and other stakeholders of civil society may also be important client groups if the purpose of the intervention is to facilitate linkage and exchange, initiate joint action, and institutionalize forms of mutual cooperation that lead to the generation of innovative and locally adapted socio-technical arrangements or other forms of societal progress.

Despite the variety of client groups and the diversity of their specific extension needs, addressing clients in groups rather than individually is the preferred approach for rural extension in most tropical and subtropical countries (see Fig. 8.1). Relative homogeneity of the groups with regard to the major determinants of the farmers' extension needs can be achieved by directing the extension services towards groups that aggregate individuals in pursuit of a common interest, plagued with identical environmental or socio-economic constraints, or willing to exploit the same opportunities despite all the remaining individual, socio-cultural, or economic differences between the farmers.

8.4.4 Extension Organization: No Single Best Solution

The plurality of extension stakeholders and the diversity of extension systems, strategies, and objectives they pursue have led to the emergence of new organizational arrangements of advisory service provision during the past years.

⁹The diversity of farmers, in particular with regard to their economic performance and the required extension services, has occasionally been viewed as a major justification of, as well as discriminator for, charging selected farmers for the extension services they obtain.

Governments through their line agencies, input suppliers and traders, private sector processing or export enterprises, churches, community based organizations, local NGOs, and donor-funded projects constitute just a few of the diverse set of extension providers that coexist or work in collaboration.

Providing extension services that address environmental issues, other public interests, or target poor or non-commercial farmers, are traditionally regarded as governmental responsibility, and that these should be provided free of charge. Conversely, providing commodity-oriented advice, or targeting commercial farmers, is perceived to be a task of the private sector, with partial or full cost recovery as the standard model. Yet, this distinction may no longer hold, as private sector companies are realizing the economic potential and business opportunities that lie in providing poor and non-commercial farmers with the products and services they need (Pralhad 2010).

Traditionally, agricultural and forestry extension has been provided through public extension service organisations, financed by and organized under the respective Ministries of agriculture, forestry, fisheries, natural resources, or rural development. This continues to be the case in most Asian and African as well as in a number of Latin American and European countries (Neuchatel Group 2008). Usually organized hierarchically from national, down to communal levels, these services, often through a number of specialized advisors, provide advice in multiple sectors such as agriculture and horticulture, livestock, natural forest management, farm forestry, primary processing, or health. Common problems of public extension services often result from the sheer size of these organizations, which frequently leads to bureaucratic and inefficient processes; role conflict between serving farmers' or the government's interest; poorly motivated and equipped frontline extension staff; and a lack of accountability of extension agents. The paradigm shift from traditional towards more contemporary extension strategies and methods requires a shift in the mindsets of long-serving extension staff, which is sometimes challenging. As one example, Swanson cites the continued tendency of public extension services to work with progressive high-resource farmers. Organizing smallholders into farmer or producer groups can help to alleviate this problem (Swanson 2008).

Recognizing that other actors can impart certain types of extension services more efficiently and more effectively, public sector agencies are increasingly promoting some form of partnership with these new providers (Collion 2004). Nevertheless, public extension services are often the only advisory services available to farmers, particularly in marginal areas where service provision is not deemed profitable from the viewpoint of the private sector.

Organizational arrangements particularly important for market-oriented extension services are contract farming and outgrower schemes.¹⁰ Under such arrangements, trading or processing companies provide technical assistance, credit, or farm

¹⁰ Outgrower schemes connote the involvement of a public enterprise or parastatal, while contract farming refers to private sector arrangements (Baumann 2000).

inputs to smallholders in return for a contractually fixed quantity and quality of an agricultural or forest product delivered at a predefined date and at a price fixed in advance of the growing season (Binswanger et al. 1995, cited in Setboonsarng 2008; see Box 8.2). While such arrangements are usually only of marginal importance if markets and value chains function well, they can be essential during the building and growth of a processing industry and considerably facilitate the transformation from subsistence to commercial economies (Setboonsarng 2008). For the purchaser, contract farming and outgrower schemes help to increase the reliability and quality of the raw material supply and reduce the cost for land leases and labour. Smallholders usually benefit from guaranteed market access, reduced risk of price fluctuations, and the availability of appropriate technical advice and inputs. Empirical evidence in relation to the benefits and economic viability of contract farming is mixed (Baumann 2000; for some examples see Arnold 1998; Gibbon et al. 2009; Kudadjie-Freeman et al. 2008; WRI 2005). Disadvantages of the arrangement stem from the power imbalance between the smallholders and the commercial entities (Neuchatel Group 2008). Through strength in numbers, farmer groups can therefore play an important role to improve the bargaining power of farmers and contribute to the success of contract farming arrangements (Setboonsarng 2008).

The restructuring of public extension organizations and the partial shift of advisory services from the public to the private domain has led to the increasing involvement of farmer groups and organizations in rural service provision (Heemskerk and Wennink 2004). At the community level, extension service providers address farmer interest or producer groups for participatory research and technology development, to facilitate experience sharing and enhance innovation diffusion. The establishment of marketing and export cooperatives serve as vehicles for improving the farmers' market access by aggregating geographically dispersed supply and demand to commercially viable levels. At the regional or national level, farmer unions, federations, or industry associations are involved in defining priorities and planning of research and extension interventions. Yet, the role of farmer organizations goes much beyond that of simply participating in, and contributing to, research, planning, and innovation diffusion. Farmer groups and organizations also act as independent extension facilitators that, either through employed advisors or through linking with external advisors, actively provide farm input, credit, market information, transport, training, or technical advice to their members or other farmers (Heemskerk and Wennink 2006; Neuchatel Group 2008). These groups further serve to increase political influence and negotiating power of smallholders. Shortage of funding and lack of management skills probably represent the greatest challenges for farmer organizations to successfully and sustainably provide these services to smallholders.

For an overview on other typical organizational arrangements in extension see, for example, Moris (1991) and Hoffmann et al. (2009b).

In view of the manifold of local contexts and challenges of rural extension work, and given the success of diverse organizational extension arrangements that suit particular circumstances, there is clearly not a single most appropriate organizational form of advisory services. Characteristic of any successful arrangement,

however, is that the organization of extension services fits with the requirements of the client groups and their economic and environmental realities; that the organization is flexible and allows for cooperation and partnerships with multiple stakeholders whenever appropriate; and that it is robust and ensures continued and sustainable service provision even if external environments are changing and unstable. A countrywide monopolistic governmental extension service, even when providing services free of charge, is no longer appropriate to serve the different functions and meet the diverse needs of the various client groups in today's world. Largely concentrating on topics of public interest and doing so in collaboration with partners that have comparative advantages should be the primary strategy of governmental extension agencies. Services that primarily target private interests should be provided through a pluralistic extension and support system, where various providers compete for the farmers' preference through an array of possible solutions. The role of governments in such situations should be limited to providing the regulatory conditions for the extension system to function well, rather than acting as a service provider itself.

Box 8.2 Smallholder Contract Tree Farming: Experiences from Thailand

Of all Southeast Asian countries, Thailand likely has the most extensive experiences in contract farming in both the agriculture and forestry sectors. Contract farming of trees, mainly of eucalyptus for the production of woodchips, has been practiced for more than 30 years. A minimum of 30,000 smallholders are estimated to manage approximately two thirds of the country's 460,000 ha of eucalyptus plantations under some form of contract farming. Purchases of logs from contracted and non-contracted farmers represent a primary supply strategy for every Thai particleboard and pulp and paper producer.

The early contract farming schemes have frequently failed as a consequence of misconception by both contractual parties on the responsibilities, benefits and limitations of the system; the competitive markets that either tempted growers or contractors to breach the contract and pursue the business with other potential partners; and an oversupply of woodchips and stagnant farm gate prices for logs in the course of the economic crash of 1997. Restrictions on timber extractions from forest concessions, civil resistance to large-scale commercial tree plantation projects, and the construction of additional processing facilities have intensified the competition for wood fibre, improved the position and bargaining power of smallholders, and thus led to a revival of contract tree farming.

Contract tree farming projects vary widely in terms of their contractual arrangements, their ability to equally benefit farmers and the processing companies, and the sustainability of the forest management operations.

(continued)

Box 8.2 (continued)

Nevertheless, contract tree growing has frequently proved to be a more profitable option to smallholders than competing cash crops. Typically, contracts are concluded between a pulp and paper, plywood or particleboard producer and individual farmers within a radius of 100–150 km from the factory gate. Depending on the plant capacity, the area harvested annually may well amount to 10,000 ha. The size of the individual smallholder plantation ranges from less than 1 ha to 50 ha, with an average size of 5–8 ha. Consequently, companies must deal with several thousand contract farmers, partially organized in farmer groups, in order to reduce the transaction costs.

Eligibility for the contract farming scheme usually requires farmers to possess a minimum holding size and land area available for planting, as well as proof of land rights. Previous experience in tree cultivation is occasionally also required. Contract periods typically range between 10 and 20 years with repeated cuttings after 3–5 years. After being accepted, farmers normally receive tree seedlings free of charge or at reduced cost, technical advice on tree planting and maintenance, and a minimum guaranteed timber price at harvest. In some cases, farmers also receive fertilizers and pesticides at cost price, labour for tree harvesting, and trucks for transportation. In return, the smallholders must strictly follow the instructions of extension officers of the company, and they are usually obliged to sell their timber exclusively to the company or its middlemen.

Overall, contract tree farming arrangements have proved to be beneficial to smallholders in terms of greater and more profitable market involvement, especially if these arrangements involve mixed cropping systems that provide farmers with a diversified income source in the early years, before trees are harvested. Furthermore, participation in a contract farming scheme can be the best way for smallholders to access financial inputs, quality tree seedlings and technical expertise required to use or rehabilitate degraded lands, such as those covered by spear grass (*Imperata cylindrica*), that they otherwise would not have the capital to clear, plant and manage. Although most arrangements are still too inequitable and unstable to be considered partnerships in any normative sense, they can provide communities with the building blocks necessary for economic and political empowerment in the longer term.

Source: Compiled from Barney (2004); Baumann (2000); FAO and CIFOR (2002); Makarabhirom and Mochida (1999); Sriboonchitta and Wiboonpongse (2005); Vermeulen et al. (2008)

8.5 Outlook

Extension and advisory services never before in history have been as necessary as today. No single farming family and no forestry or agricultural enterprise will be able to fully exploit the upcoming opportunities and successfully navigate the risks and challenges that lie ahead without relying on professional advisory support in one way or another. Intensifying labour division, specialisation and global dependencies are improving the standard of living for a majority of people worldwide. However, embedded in this are decision making, collaboration, and management considerations that are becoming ever more complex.

In light of these developments, extension is not at all an outdated concept. Providing farmers and tree growers with specific advice related to their land management practices has been necessary and relatively successful for centuries. Yet, extension services have to adapt to the changing situation and needs of their client groups. Given the specific requirements in industrialized and developing countries, in countries in transition, and in the upcoming giant economies, simply transferring blue-print approaches, methods, and organisational arrangements in extension is futile.

Based on a joint understanding of current problems and their root causes, actors in the rural development arena have to analyze the situation on a case-by-case basis and identify potential solutions. Based on an understanding of the respective visions and individual contributions of all stakeholders, suitable coalitions and cooperation partners need to be selected, concurrently, with appropriately designed approaches, methods, organizational structures, and working programs. Particularly in the field of rural extension, the learning organisation is the model for the future, as joint learning of clients and advisory service providers paves the way for success. The challenge of rural development comprises a plethora of important tasks, and rural extension services need to develop the differentiated offers that can assist problem solving in these areas.

Rural advisors, once they no longer are part of governmental structures, should organize themselves in professional unions that drive the development of binding values and quality standards, codes of conduct, training programs, and quality management systems. Explicating and adhering to these values can provide a transparent baseline for clients operating in an otherwise increasingly pluralistic and chaotic market of extension service offers (Hoffmann et al. 2009b).

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